> to prove their own powers of organisation, but as an institution of lofty traditions and high standards, the maintenance of which it has been their study to secure by constant watchfulness and such gradual changes as experience has shown to be necessary, rather than by hasty and sudden departure from the practice of the past. They have also recognised that the power of control vested in them is not one to be hastily and capriciously brought to bear upon every detail of the life of the college; that the members of the teaching staff are their colleagues and friends, men of honour, integrity and experience, whose advice and opinions on matters connected with their work should be sought for with eagerness and listened to with respect, even if they cannot ultimately accept them.
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> "When an institution has been worked under a particular system with conspicuous success for eight-and-twenty years, and in the twenty-ninth year we find, in place of order, chaos, in place of friendship and *esprit de corps* of the best kind, distrust and recrimination, when half the staff are dismissed with the notice that would be given to a coachman, and the other half are in the dark as to what their future duties are to be, when the students are on the verge of mutiny, and threats of dismissal are daily occurrences—it is not 'the system' which is to blame."

The president of the College apparently rules as an autocrat, and the members of the teaching staff have to do as he directs them, whatever their own opinions as to the scheme of work or value of subjects may be. The Board of Visitors has a conference with the president for an hour or so once a year, and his views or recommendations are naturally adopted. The board does not come into contact with the teaching staff, and the members are, therefore, unable to understand the conditions under which the work of the College is carried on. It is stated, indeed, that the Board of Visitors imagined the revised curriculum submitted to have been considered by the teaching staff, whereas the staff were not consulted.

We notice in the *Times* the statement that the Secretary of State for India has refused to grant the inquiry asked for, but it is to be hoped the matter will not be allowed to rest here. A strong deputation must be organised to present the memorial which we understand has been prepared, begging for an inquiry into the case, and directing attention to the position of the teaching staff in relation to the educational policy of the College. Unless there is a reformation, the case of the members of the staff left will be even worse than that of those who have been ordered to retire in such an inconsiderate way.

Among the signatures already appended to the memorial are those of—Lord Kelvin, Lord Lister, Lord Rayleigh, Sir William Huggins, Sir Frederick Abel, Sir Frederick Bramwell, Sir William Crookes, Sir Archibald Geikie, Sir Norman Lockyer, Sir Andrew Noble, Sir Henry Roscoe, Prof. Armstrong, Mr. W. H. M. Christie, Prof. Dewar, Prof. Ewing, Mr. R. T. Glazebrook, Mr. W. N. Shaw, Prof. J. J. Thomson, Prof. Marshall Ward, and of some seventy other Fellows of the Royal Society. Professors and teachers at all the educational centres in the country are sending in their names and testifying to the widespread indignation at the action of the India Office.

H. W. CHISHOLM.

MR. H. W. CHISHOLM, late Warden of the Standards, Board of Trade, died in his ninety-second year on January 16. He was formerly chief clerk of the office of the Comptroller General of the Exchequer, and on the abolition of that office in 1866 he was appointed to take charge of the old Department of Weights and Measures. In 1867 a new Standards Act was passed, by which all powers and duties of the Treasury and Exchequer were transferred to the Standards Department of the Board of Trade, and Mr. Chisholm was made the chief of the department with a salary of 1000*l.* per annum. In 1868, mainly on Mr. Chisholm's representations, a Royal Commission on Standards was appointed, on which he became an active member. The Commission included also the late Prof. W. H. Miller, Sir George Airy and General Sabine, eminent men of science, by whose efforts the Standards Department was raised to a prominent scientific position, furnished with proper standards of length, mass, capacity and cubic measurement, and with instruments essential for verifications for scientific purposes.

Mr. Chisholm held the appointment of Warden of the Standards until 1877, when he retired after fifty-three years of public service. With his retirement the title of Warden of the Standards was dropped, the duties then being undertaken by a superintendent of the Standards Department.

Mr. Chisholm issued an annual report during the ten years he held office, which was always full of information of great interest and public use, and in which metrological researches were dealt with in an exhaustive manner. For instance, amongst the subjects which his printed reports dealt with we find, besides the ordinary work of testing and comparing, standards of measure, &c., investigations as to the expansion of metals, density of water, effects of atmospheric pressure with reference to the measurement of gas, calculation of probable errors of observation in micrometric work, &c.

Mr. Chisholm took a prominent part in the early work of the Bureau international des Poids et Mesures at Paris, which was established under a Metric Convention; and he represented Great Britain at a diplomatic conference at Paris in 1875. In 1877 he published a book relating to the history, &c., of the standards, entitled "Weighing and Measuring" (Macmillan).

With Mr Chisholm an important link has passed away between the old and the new civil servants, and all who had the pleasure of knowing him well will remember for many years his varied abilities, cheerful disposition, and his desire to help others.

NOTES.

IN consequence of the death of the Queen, all the lectures at the Royal Institution have been abandoned until further notice.

WE have received information from Cairo that the time ball at Port Said is dropped daily at 12 noon (30° meridian time) by direct automatic signal from Abbassia Observatory. Omdurman receives the same signal, and from about the middle of February the time ball at Alexandria will be similarly controlled. Arrangements have been made by which a daily weather telegram at 8 a.m. is exchanged between Alexandria and Malta, Brindisi, Trieste, Athens and Beirut. The information so received is posted outside the port offices at Alexandria and Pord Said daily for the use of shipping.

PROF. R. BLANCHARD has resigned his office of general secretary of the Zoological Society of France, after twenty-three years of service. The Society has decided to present him with a medal in commemoration of his work.

WE regret to see in the *Times* the announcement of the deaths of Dr. Danckelmann and M. Gramme. Dr. Danckelmann was director of the Prussian Royal Academy of Forestry at Eberswalde. He rendered great services to the science and art of forestry in Prussia, and was one of the first to advocate effectively the training of foresters in special colleges. He took a leading part in the teaching at Eberswalde and was the author of many interesting works on forestry. M. Gramme will be remembered by his inventions in connection with dynamos and electric batteries. For his dynamo he received 20,000 francs from the French Government and the Volta prize of 20,000 francs from the Academy of Sciences.

The annual general meeting of the Geologists' Association will be held at University College on Friday, February 1. The president, Mr. W. Whitaker, F.R.S., will deliver an address entitled "Twelve Years of London Geology."

The thirty-first course of lectures and demonstrations for sanitary officers will commence at the Sanitary Institute on February 1. There will be four lectures on elementary physics and chemistry in relation to water, soil, air, ventilation and meteorology; twenty-one lectures on public health statutes, the practical duties of a sanitary inspector, municipal hygiene, and building construction; and seven lectures on meat and food inspection.

Captain J. C. Bernier, of Quebec, is in England, and has described to a Reuter's representative and the Royal Colonial Institute his plans for an Arctic expedition, which have received the approval of the Quebec Geograpical Society. His first plan is to enter Bering Strait during July, and, following the Siberian coast, the ice would be entered between 170 and 165 degrees, as far east as its state would permit, pushing north in August and September, and dropping buoys at intervals to test the ice drift. Monthly, as the wind suited, small balloons would be despatched with records, each balloon having a copy of the previous records. Photography would be largely employed, kites being used for long-distance photographs. With suitable appliances, it was known that a long distance could be run on the packed ice during the proper season. In the second spring and summer it is suggested that two routes be taken—one in a north-east, the other in a south-west direction—with stations at intervals, keeping communication with the ship by wireless telegraphy and gun signals. The routes would be marked at mile intervals by hollow staves, the hollows being filled with condensed provisions and records, and each staff would be numbered. When in the neighbourhood of the Pole, the north-eastern route would be extended to more stations, always in communication with the ship. These plans are to be laid before the Canadian Government.

The annual report of the Council of the Institution of Mechanical Engineers was read at the annual meeting on Friday last. We learn from it that the award of the Willans premium has been for the first time in the gift of the Council, and, from the papers read before the Institution since the foundation of the fund in January 1895, they have selected that read in April 1895 by Captain H. Raill Sankey, on "Governing of Steam-Engines by Throttling and by Variable Expansion," as the most suitable for the award. Sir William Roberts-Austen is still at work upon the sixth report to the alloys research committee, dealing mainly with the effect of annealing and tempering on the properties of steel. Prof. F. W. Burstall expects to complete his second report to the gas-engine research committee in the course of a few weeks. Progress has been made in the experiments on the value of the steam-jacket, by Prof. T. Hudson Beare. Prof. D. S. Capper has made a first series of tests on the compound steam-jacketed engine at King's College with different steam-pressures and speeds, working single-cylinder, non-condensing. The results have been worked out, and are expected to be ready shortly. The Council have consented to take charge of the mechanical section of the Glasgow International Engineering Congress, the meetings of which will be held during the first week of September. They have also decided that these arrangements should not interfere with the ordinary summer meeting of the Institution, which will be held during the last week in July at Barrow-in-Furness. Mr. W. H. Maw has been elected to succeed Sir W. H. White as president of the Institution.

The experiments made with a view to using liquid air as one of the constituents of an explosive are described by Mr. A. Larsen in a paper (No. 786) received from the Institution of Mining Engineers. The cartridges used for blasting trials in the Simplon tunnel consisted of a wrapper filled with a carbonaceous material, such, for instance, as a mixture of equal parts of paraffin and of charcoal, and dipped bodily in liquid air until completely soaked. The cartridges were kept in liquid air at the working face of the rock until required for use, when they were put quickly in the shot-holes and detonated with a small guncotton primer and detonator. The life of such a cartridge is, unfortunately, very short after the cartridge has been removed from the liquid air. A cartridge eight inches in length and three inches in diameter has to be fired within fifteen minutes after being taken out of the liquid to avoid a miss-fire. On this account the Simplon trials were discontinued; nevertheless, Mr. Larsen says that much attention is still being devoted to the matter in Germany, where investigations are being carried on in three different centres, one of them being the largest explosives works on the Continent, namely, the carbonite factory at Schlebusch.

A report of the Government of India shows that during the year 1899 the number of deaths among human beings attributed to wild animals was 2966. Tigers caused the death of 899, wolves of 338, and leopards of 327 human beings, while bears, elephants, hyenas, jackals and crocodiles were accountable for a large proportion of the remainder. The loss of human life from snakes reached the high total of 24,621, a greater mortality than in any of the four preceding years. Nearly half the deaths occurred in Bengal, while the North-Western Provinces and Oudh came next with nearly one-fourth of the total. In Bengal the relatively high mortality is attributed to floods, which drove the snakes to the high lands on which village homesteads are built. As will be observed, snakes are more destructive of human life than are the wild animals, but the reverse is true of the destruction of cattle. In 1899 no fewer than 89,238 cattle were destroyed by wild animals, and 9449 by snakes.

The U.S. Weather Bureau has published a very useful and comprehensive treatise on West Indian hurricanes, by Prof. E. B. Garriott (*Bulletin*, No. 232). The chief of the Weather Bureau points out that the paper in question reviews the writings of the more prominent meteorologists of the past century, so far as they refer to the tropical storms of the North Atlantic, and that it graphically illustrates and describes the more important hurricanes that have occurred during the last twenty-five years. A table is given (partly taken from that by Señor A. Poey) of the chronological occurrence of West Indian hurricanes since 1493. This list shows that while storms occurred in every month, the great majority took place between July and October. During the principal hurricane months the storms generally recurved east of the Gulf of Mexico, the mean track being farther west in September, when it approached very near the East Florida coast. But the tracks from 1878 to 1900, which are laid down on charts, show that during the principal hurricane months recurvature may occur from far to the eastward of the Bahamas to the west coast of the Gulf of Mexico.

We have received from the meteorological reporter for Western India a copy of his "Brief Sketch of the Meteorology of the Bombay Presidency for 1899-1900." The meteorology of the year is of more than usual interest, owing to the almost unprecedented failure of the south-west monsoon rains over a large region, and the consequent partial or total failure of crops and water supply. From a statement showing the most severe droughts and famines of the last 150 years, and the areas affected, it appears that the drought of 1899 and famine of 1899-1900 extended over a very much larger area than that of previous years. The failure of the rainfall was chiefly due to the weakness of the Arabian Sea monsoon current, which generally brings heavy rainfall in July and August. Another feature of the year was the abnormal high barometric pressure which obtained during the monsoon months. The observations of many years show that such conditions are attended by a general decrease in the rainfall; in the years 1876, 1896 and 1899, the most recent years of drought, the average pressures during the monsoon months were ·015, ·012 and ·054 inch, respectively, above the normal. It is noteworthy that in South Africa 1899 appears to have been a year of excessive rainfall.

THE *Electro-Chemist and Metallurgist* has made its appearance, and we trust it has come to stay; for it should be the means of directing attention to a very promising branch of applied electricity, and of advancing a knowledge of electro-chemistry. Germany has two periodicals devoted exclusively to electro-chemistry, and is in advance of us, not only in this respect, but also in the provision made for the study and use of electro-chemical processes. The first article in the new periodical, on "Recent Progress in Electro-chemistry," shows that England's share in the advances of recent years is not in proportion to her position in science and industry. It is stated that the total horse-power expended in electro-chemical industries is about 400,000, "equivalent to a total yearly production valued at over 30,000,000*l.*, of which the United States contributes between 60 and 70 per cent., Germany and France about 10 per cent. each, Switzerland about 2 per cent., and England not more than 1½ per cent." Among the subjects of other articles in the journal are little-known carbides, borides and silicides; electro-chemistry at the Paris Exhibition; deposition of metals from mixed electrolytes; and the present and future of accumulators. In addition, there are several pages of abstracts from foreign contemporary journals, and from recent patent specifications. The journal will be published monthly, and should have a wide sphere of influence in the electro-chemical and metallurgical professions in England.

To the December issue of the *American Naturalist*, Prof. H. F. Osborn contributes the third instalment of his investigations into the origin of the Mammalia, taking as his text the evolution of the occipital condyles of the skull. It has been very generally supposed that the paired mammalian condyles are inherited directly from those of the Amphibia. This, however, the author considers to be a misconception; his objection being largely based on the circumstance that in the Amphibia the condyles are derived exclusively from the exoccipitals, without any trace of a basioccipital element. On the other hand, in many mammals, especially Echidna, the basioccipital forms the basal portion of the condyles, or, at all events, the intercondylar interval; and it is shown by figures how such condyles are traceable to the tripartite condyle of reptiles by the gradual abortion of the median basal element. In fact, one anomodont reptile (*Cynognathus*) has actually attained the dicondylar type by means of this elimination.

IN the same journal, Prof. C. S. Minot, preparatory to the publication of a text-book on the subject, calls attention to his own method of teaching mammalian embryology. He recommends, first, the study of pig embryos of from 9 to 12 mm. in length, and, secondly, larger examples of the same, after which the embryo chicken should be taken in hand to illustrate the germ-layers. Then should come the study of the fœtal envelopes, including the human placenta, and finally an investigation of the genital elements, segmentation, &c. Before calling attention to the importance of the "cervical bend" as distinctive of mammalian embryos, Prof. Minot takes occasion to refer to the superiority of the German system of "black line" wood-engraving for the purpose of illustrating embryological studies, the cheapness of German work being likewise an important factor.

DR. J. BEARD, of Edinburgh, has recently contributed to the current volume (xviii.) of the *Anatomischer Anzeiger* two suggestive papers bearing on the fate and function of that physiological puzzle, the thymus gland. In the former of these (Nos. 15 and 16) he identifies a certain structure in the spiracle of the ray (Raia) as the representative of the thymus. In the latter (Nos. 22 and 23) he arrives at the conclusion that the thymus is the source of all the "leucocytes" of all true vertebrated animals, and hence that it is the origin of all the lymphoid structures of the body. The latter statement, he observes, throws light upon the fact that the thymus is an example of an organ which, after being functional in early life, gradually atrophies. "This is only certainly known to happen in mammals, and from it the inference is drawn that in later life the organ ceases to exist. It no more ceases to exist than would the Anglo-Saxon race disappear were the British Isles to sink beneath the waves."

AN interesting description of the ravages of white ants, or termites, in Rhodesia is furnished by the Rev. A. Lebœuf to the *Zambesi Mission Record* for January. The special interest of the contribution centres in the account of the damage done to property by white ants in Rhodesia, which seems to be even greater than in India. It is no uncommon thing, says the writer, for the colonist, on returning from his day's labour, to find the coat he left hanging on a nail of his cottage wall and the books on the table absolutely destroyed by these tiny marauders. Nor is this all. "On awaking next morning," writes Mr. Lebœuf, "you are astonished to see in the dim light a cone-shaped object rising from the brick floor a short distance from your bed, with two holes on the top like the crater of a miniature volcano. Upon closer examination you discover that the holes have just the size and shape of the inside of your boots, which you incautiously left on the brick floor the night before. They have given form and proportion to an ant heap, and nothing is left of them except the nails, eyelets and, maybe, part of the heels." And as the same dismal story—with variations—has to be told about every other article of apparel and all perishable objects, it must be admitted that there are drawbacks to the lot of a settler in Rhodesia.

THE *Agricultural Students' Gazette* for December contains an appreciative article on the late Sir John Bennet Lawes, who always took a kindly interest in the success of the college at Cirencester.

THE West of Scotland Agricultural College has sent out an interesting report on a series of experiments on the growth of oats in the season of 1899. A considerable number of the leading varieties were grown under equal conditions in various districts of Scotland; their yield, as regards grain, straw, meal and husk, being subsequently determined. While the results of a single season—and that an altogether abnormal one—cannot be accepted as final, enough is shown to justify further attention being bestowed on the matter. Greater care should, however, be given in future to safe-guarding the crops against the depredations of birds and ground game, for where such pests are admitted to have interfered with growth, a justifiable lack of complete confidence in the results is engendered. On the whole the older varieties have come satisfactorily through the trial, most of the newer sorts being apparently unable to contend successfully with unfavourable conditions of growth. They have, moreover, in some cases an undesirably thick husk, and a correspondingly small kernel. It is to be hoped that Profs. Wright and McAlpine have continued this work during the past season.

THE current number of the *Journal* of the Royal Agricultural Society of England opens with an interesting account, from the pen of Dr. Voelcker, of the results obtained by means of pot-culture at the experimental station at Woburn. He first points out the advantages and the limitations of this form of research, and, like Wagner, of Darmstadt—the originator of this method of cultural experiment—advises that results obtained in pots shall subsequently be tested in the field before they can be confidently recommended to the attention of practical agriculturists. A considerable amount of time has been taken up in testing the effects, on farm crop-plants, of "rare forms of earth," as stipulated by Mr. Hills in his bequest. For the most part the results are not encouraging, though some benefit appears to have resulted from steeping the seeds of cereals in one per cent. solutions of sodium iodide and sodium bromide. Where equal numbers of large and small seeds of wheat and barley were sown in separate pots the yield was, rather unexpectedly, but little affected by the difference in character of the seed. The journal, further, contains some interesting matter on the manufacture and ripening of cheese, by Prof. Reynolds Green, and the valuable report of the Tuberculin Committee.

THE phenomenon of anaërobic life, originally discovered and defined by Pasteur as the existence of living forms in the absence of oxygen, has recently had fresh light thrown upon it by the important researches of Dr. Klett, of Würtemberg. Investigating the problems surrounding the production of sporeless anthrax outside the living body, Dr. Klett has found that if anaërobic conditions for the bacillus are provided by the substitution of nitrogen for air, the growth of the organism is not impaired, and spores develop as freely as under ordinary conditions. If, however, the air be replaced by hydrogen, no spores develop providing the nutritive medium is of a character which permits of the gas being in intimate contact with the culture. It is not, therefore, as supposed by so many investigators, the absence of oxygen which is responsible for the non-production of spores in so-called anaërobic cultivations of anthrax, and this view is also supported by Dr. Weil's experiments on this subject. The mystery of the phenomenon remains still to be solved; meanwhile Dr. Klett has provided a new method for the production of sporeless or asporogène anthrax, and in future it will be advisable to supplement the term anaërobic as applied to a micro-organism by referring to the conditions under which the latter was deprived of air.

THE Zoological-Botanical Society of Vienna will hold its Jubilee meeting on Saturday, March 30. Representatives of the various learned societies with which the Society is in correspondence are invited to the meeting. Information from those intending to be present is requested by the secretaries not later than the middle of February.

TWO communications have reached us from the U.S. Department of Agriculture (Division of Vegetable Physiology and Pathology). The first (*Bulletin* No. 25), by H. Von Schrenk, deals exhaustively with the diseases caused by fungi to which conifers are liable in New England, the symptoms of the disease, the nature of the injury inflicted, and the remedies. The parasitic fungi to which attention is specially directed are *Polyporus Schweinitzii*, *P. pinicola*, *P. sulfureus*, *P. subacidus*, and *Trametes Pini*. The second (*Bulletin* No. 23) describes a disease, known as the spot disease, to which violets grown in America are liable, so virulent that the cultivation of the flower has been abandoned in many parts of the country. It is due to a parasitic fungus, probably of American origin, which the author, Mr. P. H. Dorsett, describes as a new species under the name *Alternaria Violae*. Both papers are very well illustrated.

PROF. STRASBURGER has recently published, in the *Biologischen Centralblatt*, an account of his observations on certain diœcious plants, especially *Melandrium* (*Lychnis dioica*). It is well known that the flowers of this plant are normally unisexual, and that there are also certain correlated differences, *e.g.* the elongation of the internode between the calyx and the corolla, which are likewise characteristic of the staminate flowers. But whereas the stamens are, as a rule, reduced to minute rudiments in the female flowers, they are stimulated to develop, in a normal manner, if the plant happens to become infected with the smut fungus, *Ustilago violacea*. The stamens then grow and advance so far as to form the pollen mother cells in a manner indistinguishable from the process as it occurs in the ordinary staminate flowers; but the fungus, perhaps owing to the abundant supply of available nutrition, then becomes virulent, it kills and consumes the cells, and the anthers are finally filled with the purple spores of the parasite. Nor is this all, for the ovary becomes arrested in its development, the ovules hardly advancing beyond the embryo-sac formation. Moreover, the lengthening of the calyx-corolla internode referred to above also occurs, and these facts have given rise to the mistaken impression that the fungus merely castrated the stamens of a male flower, causing the female organs to develop. This is not the case, for when the male flowers are attacked there is no development of the pistil to be seen. Prof. Strasburger utilises these results as the basis for a treatise on the possibilities of artificially interfering with, or determining, the sex of unisexual organism, and the whole paper is well worth careful reading for the wealth of illustration and critical exposition which it contains. The conclusion is reached that it is not possible, at least in the higher plants and animals, to influence the sex of an individual either by nutrition or by modifying the normal physical environment. The organism in this respect develops on predetermined lines, and only an extraordinary stimulus can surprise the latent potentiality into active development.

A CATALOGUE of the recent marine sponges of Canada and Alaska is contributed by Mr. L. M. Lambe to the *Ottawa Naturalist* (vol. xiv. No. 9).

PROF. E. RICHTER has issued the fifth report on the periodic variations of glaciers (*Archives* des Sc. phys. et nat. Geneve, tome x. 1900). References are made to glaciers in Europe, the Polar regions, North America and Asia.

MR. R. E. C. STEARNS publishes some revisions of the nomenclature of Tertiary land shells of the John Day Region in Western North America (*Proc.* Washington Acad. Sc. vol. ii. December 1900). Thus the species named *Helix* (*Aglaia*) *fidelis*, Gray (Stearns) now becomes *Epiphragmophora fidelis antecedens*, Stearns. Truly multiplication becomes vexation in the case of zoological names.

WE have received the annual report of the Geological Commission of the Cape of Good Hope for 1898 (Cape Town, 1900). It is a record of arduous but highly interesting work, hampered to some extent by the want of good maps, but of acknowledged advantage to the inhabitants of Cape Colony. The field-work has been carried out by Messrs. A. W. Rogers and E. H. L. Schwarz under the superintendence of Prof. Corstorphine, and they furnish detailed reports on the districts examined, including the country around Worcester.

THE Geological Survey of India has lately issued several important scientific works. In the Memoirs (vol. xxviii., Part 2) there is an essay on "The Charnockite series, a group of Archæan hypersthenic rocks in Peninsular India," by Mr. Thomas H. Holland. The history of the naming of this series is interesting. A hypersthene-granite, regarded as a new type, and composed of hypersthene, microcline, quartz and accessory iron-ores, was discovered in 1892; and it was afterwards found that the tombstone of Job Charnock, the founder of Calcutta, was made of the same rock, so the name Charnockite "was suggested for it in honour of the man who was the unconscious means of bringing the first specimen of this interesting rock to the city which ultimately became the capital of India." The members of the Charnockite series are now fully described and illustrated. They are regarded as igneous in origin, and as intrusive in the older schists and gneisses.

IN the "Palæontologia Indica" we have (in series xv., relating to Himalayan fossils, vol. iii. part 2) a monograph on the Trias Brachiopoda and Lamellibranchiata, by Dr. Alexander Bittner, a work translated by Dr. and Mrs. A. H. Foord. About sixty species are described. The genera are all well known and generally distributed in the Alpine Trias. Identical species, however, are only sparingly represented in India. Another monograph (belonging to series ix., Jurassic Fauna of Cutch, vol. ii. part 2) is on corals, by Dr. J. W. Gregory. A magnificent collection of corals from the Peninsula of Cutch was made by Wynne and Fedden and Stoliczka between 1867 and 1872. It was sent to England in 1890 in the hopes that the late Dr. Duncan would undertake the task of description. Owing to failing health he requested Dr. Gregory to carry out the work, and this the latter has now done with conspicuous ability, but not without much anxious consideration. The author was reluctant at first to treat as mere individual variations differences which in the case of the corresponding European corals are regarded as of specific value; but he was driven, and happily so, to this course, as the alternative was the creation of some 3,000 new species or varieties. The bulk of the collection comes from the Putchum Beds (Bathonian) to the north-west of Jumara, and they represent a coral bank rather than a reef. Some corals were obtained from the Chari Beds (Callovian and Oxfordian), and some indicate higher geological horizons. In all seventy-one species are described, and illustrated in a series of excellent plates.

THE question of Hindu castes is treated by Mr. Tribhovandas Mangaldas Nathubhai in the *Journal* of the Anthropological Society of Bombay (vol. v. p. 74). He points out that "the present castes did not strictly adhere to their original distinguishing characteristics," and that the spirit of the original laws "not being rightly understood and followed, they yielded not the advantages intended, and produced evils never contemplated." The author makes some sensible remarks on the re-marriage of widows; and with regard to the caste system he advocates, not abolition of caste or the raising of the status of the lower castes, but a reversion to the teaching of the Shastras. In the same number of the journal are some notes on the folk-lore of the lizard and ominous birds in India.

AN article upon Huxley's life and memoirs appears in the January number of the *Quarterly Review.*

THE meteorological observations made at the Adelaide Observatory and other places in South Australia and the Northern Territory during the year 1897, under the direction of Sir Charles Todd, K.C.M.G., F.R.S., are tabulated and discussed in a volume just published by the Government of South Australia.

A NEW volume of "The Fauna of British India, including Ceylon and Burma," edited by Dr. W. T. Blanford, F.R.S., has been published under the authority of the Secretary of State for India. The author of the volume is Mr. R. I. Pocock, who mentions in the preface that it "contains descriptions of all the species of Arachnida of the orders Scorpiones (scorpions), Uropygi (whip-scorpions), Amblypygi, Solifugæ, and of most of the larger and otherwise conspicuous species of Araneæ (true spiders) known to occur in British India, Burma and Ceylon, together with diagnoses of the genera, families and sub-orders into which they fall."

Popular Astronomy for December 1900 contains the address delivered by Mr. J. A. Brashear at the ceremony of laying the foundation stone of the New Allegheny Observatory at Riverside Park, Allegheny, Pa The history of the institution is reviewed since its incorporation in 1860. Prof. F. L. Wadsworth is the present director of the Observatory. The existing fine equipment is to be considerably augmented, and a special feature is that one department is to be open day and night to the students in the high schools and higher grades of the common schools, and also to citizens—a proposal first suggested by the late Prof. J. E. Keeler, a former director.

MESSRS. ILIFFE, SONS AND STURMEY, LTD., have sent us the fourth edition of Mr. John A. Hodges' "Practical Enlarging." This edition, we find, has not only been thoroughly revised and brought up-to-date, but much additional matter has been included. The worker is provided with a sound and elementary practical handbook, and it is interesting and important to note what the author states in the preface, that "no formula is given, nor any method of working described, which I have not personally thoroughly tested and proved to be trustworthy." With the introduction and general use of hand cameras and lenses giving flat fields, the process of "enlarging" the originals is now so widely adopted that such a serviceable handbook as this will be found most useful.

"WILLING'S PRESS GUIDE" is a handy index to the press of the world. The newspapers and other periodicals included in the lists are classified alphabetically according to title, and are also arranged in other groups according to place of publication and subject. We notice a few curious entries in the various classes of scientific publications of the United Kingdom. Under Astronomy the reports of two observatories are included, and "Astronomical Leaflets" which are not known to us. Under Science also several unimportant publications are named, while others are omitted. For instance, the *Journal* of the City of London College Science Society is given, but the *Philosophical Magazine* does not appear in the list, though it does appear under Philosophy. Reports of local scientific societies are also mentioned under Science and other heads, but the "Year-Book of Scientific Societies" shows that the number of omissions far exceeds that of societies included. If space cannot be found for the reports of all important local societies concerned with natural history and other sciences, it would be better to omit such societies entirely. At present the lists do not give a correct view of the publications of societies of this kind.

SOME interesting measurements of the electromotive force of concentration batteries containing non-aqueous solutions are communicated by L. Kahlenberg in the *Journal of Physical Chemistry* (vol. iv. p. 709). Whereas the E.M.F. of batteries containing aqueous solutions has been shown in very many cases to agree quite well with the potential difference calculated on the basis of Nernst's osmotic theory, the author's experiments indicate that the difference between the observed and calculated electromotive force is very considerable in the case of solutions in non-aqueous solvents. In view of the discrepancies, it is suggested that Nernst's formula should be subjected to a rigid test for the case of non-aqueous solutions.

A COURSE of lectures on electro-chemistry to a large audience is only with great difficulty capable of being illustrated by quantitative experiments. The usual methods of measuring current, resistance, voltage, &c., cannot readily be adapted in a completely satisfactory manner to the exigencies of the lecturetable: A measuring instrument to remedy the defects associated with the use of the ordinary apparatus is described by Messrs. Miller and Kenrick in the *Journal of Physical Chemistry* (vol. iv. p. 599). Provided with a dial two feet in diameter, and "dead-beat" in its action, the instrument is so arranged that ohms, mhos, volts and amperes can be read off directly, and it can be changed from any one use to any other without delay. A series of fifteen quantitative experiments, chosen so as to illustrate the various principles of electro-chemistry, and which can be shown to a large class by means of the instrument, are described by the authors.

THE additions to the Zoological Society's Gardens during the past week include a Stanley Crane (*Anthropoides paradisea*) from South Africa, presented by Mr. J. E. Matcham; a White Pelican (*Pelecanus onocrotalus*), a Lesser Black-backed Gull (*Larus fuscus*), European; a Yellow Hangnest (*Cassicus persicus*), a Common Boa (*Boa constrictor*) from South America, two Japanese Greenfinches (*Ligurinus sinicus*) from Japan, a Yellow-winged Sugar-bird (*Coereba cyanea*) from South America, a Three-striped Boa (*Lichanura trivigata*), a Chained Snake (*Coluber catenifer*), a —— Snake (*Zamenis taeniatus*), a —— Snake (*Rhinochelus lecontii*) from North America, deposited; an Axis Deer (*Cervus axis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEW VARIABLE STARS.—Two more variables are announced in the *Astronomical Journal*, vol. xxi. No. 487, as having been detected by Mr. R. T. A. Innes, at the Cape Observatory.

24.1900. *Arae.* This star is C.P.D. – 49° 10361, and has the position

$$\left.\begin{array}{lrrr} & \text{h.} & \text{m.} & \text{s.} \\ \text{R.A.} = & 17 & 49 & 32 \\ \text{Decl.} = & -49^\circ & 24'{\cdot}9 & \end{array}\right\}(1875).$$

The range in magnitude is from 8·9 to 9·75, and the period very short—about 7h 28m. 36s.

25.1900. *Octantis.* This star is No. 9192 in Gillis's Polar Zones, and has the position

$$\begin{array}{lrrr} & \text{h.} & \text{m.} & \text{s.} \\ \text{R.A.} = & 13 & 9 & 32 \\ \text{Decl.} = & -83^\circ & 34'{\cdot}1 & \end{array}$$

The variation in magnitude is from 7·7 to 10·3.

THE ALMUCANTAR.—The Case Observatory, Cleveland, Ohio, has recently been equipped with one of the new type of instruments invented by Dr. S. C. Chandler in 1879, and in the *Astronomical Journal*, vol. xxi. No. 488, Mr. C. S. Howe gives a description of its construction and working, illustrated by photographs of the instrument in position. It is adaptable for all determinations usually made with the transit circle, as time, latitude, right ascensions and declinations, &c., but has several advantages. As the name implies, the instrument is inclined at a fixed elevation, generally equal to the latitude of the station, and being free to move in a horizontal plane, the times of passage over the parallel of altitude are observed in exactly similar manner to meridian transits; in general both transits may be observed, east and west. The advantages claimed are (1) elimination of flexure; (2) elimination of refraction errors depending on zenith distance, leaving only those produced by variations of pressure and temperature; (3) greater precision of fundamental plane of instrument; (4) greater extent of sky available.

The Case almucantar has an object-glass of 6 inches aperture and 60 inches focus, by Brashear, and instead of the telescope being inclined, the light is reflected from a mirror inclined at the proper angle, outside the object-glass.

The whole of this optical apparatus rests on a massive hollow iron ring 57 inches in diameter, which floats in mercury, means being provided for preventing lateral movement. The float, telescope tube and frame weigh about 1800 pounds, and additional weights are provided for adjusting the position of the centre of gravity. Preliminary experiments show that although the instrument weighs about 2300 pounds, the oscillations after it has been moved die out in slightly over one minute, so that stars can be observed at intervals of three minutes. Another of these instruments, of about the same size as the above, has been erected at the Durham Observatory, and is described by Prof. R. A. Sampson in *Monthly Notices*, vol. lx. pp. 572-579.

THE ETHNOLOGY OF ANCIENT HISTORY DEDUCED FROM RECORDS, MONUMENTS AND COINS.

SERIOUS students of ancient history are fully aware that the narratives which have been preserved by professional historians are usually so eclectic and so meagre in many important details that they require to be largely supplemented by other data before the full significance of the events can be appreciated. The spade of the archæologist has provided innumerable documents of the greatest historical importance which serve to supplement the imperfection of the written record, and the observations and measurements of the physical anthropologist have to be called into evidence as well as the comparative studies of the ethnologist. The historian who ignores archæology, physical anthropology and ethnology deprives himself of the most voluminous of historical documents which lead, when carefully studied, to accurate conclusions. Thus alone can written records be established.

As in the distribution of animals, so in that of man, it is impossible to draw a line of demarcation between Europe and Asia. The pure Northern European type is as distinct as possible from the true Mongol, but there is such a chain of links between these two primary human races that they pass insensibly into one another.

It is now generally admitted that the fair dolichocephalic European race (*Homo Europaeus*, the Northern or Nordic race of some authors, the Aryan of others), stretched in Neolithic times far away into Asia, where they mixed to a variable extent with the Mongols, more so to the eastward, less so to the westward. To portions of this hybrid population have been applied such terms as Allophylian, Turanian, Finno-Turki, Ural-Altaic, Ugro-Altaic, Turko-Tatar, Mongolo-Turkic, Tatar, Turki. Part of this spectrum of mixed peoples was spoken of by ancient historians under the collective name of Scythians, those in Europe being "Aryans," those in the extreme east being largely Mongolised.

A short, dark, brachycephalic race (*Homo Alpinus*, Alpine or Slavo-Celtic race) which wandered into Central France in Neolithic times still persists in a central zone across Europe and into Asia, and there can be little doubt that this element also entered into the population of Western Asia in very early times. But at whatever period they arrived, their descendants can be found amongst the Tadjiks, who are brown brachycephals and quite different from the brachycephals of the yellow race whose point of origin appears to have been towards Tibet, whereas Lapouge and Ujfalvy believe the former to have followed the dolichocephals either from Asia Minor or from Europe.

A third race, of medium stature and dark complexion, is the dolichocephalic Mediterranean group (*Homo Mediterranensis*). This was located in Neolithic times in Western and Southern Europe, Northern Africa, South-Western and Southern Asia. The Dravidian peoples of India do not now concern us, and attention need be drawn only to the Semitic branch of the Mediterranean race, with its various offshoots. It is possible that the rise of Babylonian culture was due, as Keane points out, to the influence of Semites on the indigenous Akkado-Sumerians, who were almost certainly of Finno-Turki origin.

The typical Mongols (*Homo Mongolicus*) are a short, brachycephalic people with a yellowish skin, high cheekbones, very characteristic eyes, lank, black hair on the head, and sparse hair on the face. This race is as purely Asiatic as the negro is African.

The easterly drifting of tall, fair, long-headed peoples speaking dialects of the Aryan group of languages took place, perhaps, about 2000 B.C. The migrants to India had scarcely attained the agricultural phase of culture, and it was not until the conquests of Alexander in 327 B.C. that a true civilisation flourished in the Panjab. The Persian branch advanced much more rapidly, owing to their proximity to the ancient civilisations of Mesopotamia.

Few portions of the world have had so complex a history as the region between the Caspian Sea, the Persian Gulf and the